UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,951	11/21/2000	Mikko Huttunen	274039	4662

7590 12/17/2004

Pillsbury, Winthrop LLP
1600 Tysons Boulevard
McLEAN, VA 22102

EXAMINER	
PERILLA, JASON M	
ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/700,951	HUTTUNEN, MIKKO	
	Examiner	Art Unit	
	Jason M Perilla	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-6 and 8-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-6 and 8-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 November 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 2, 4-6, and 8-10 are pending in the instant application.

Response to Amendment/Remarks

2. In the remarks of the amendment filed September 2, 2004 (page 5), the Applicant notes that during a personal interview on August 4, 2004, an agreement was made that the addition of the limitation "wherein the error estimate is at least in part generated by individually determining a plurality of point to point quadratic error comparisons between the generated signal path and a reference signal path" into the independent claims overcomes the previous prior art rejection of Love et al (5363412 – IDS Paper No. 5; Ref. BR) in view of Birchler et al (US 5440582). Specifically, the limitation is not explicitly disclosed by the reference Love et al. However, upon further search, a new rejection is made in view of Love et al in view of Wallerius et al (US 6192038), and in further view of Dent et al (US 6567475).

Claim Objections

3. Claims 1, 2, 4-6, and 8 are objected to because of the following informalities:

Regarding claim 1, in line 12, "the signal path is" should be replaced by –the signal path generated is--, in line 14, "the difference" should be replaced by –the difference--, in line 15, "the channel estimate" should be replaced by –a channel estimate--, and, in line 16, "the state of the radio channel used" should be replaced by –a state of a radio channel used--.

Regarding claim 4, in line 5, "the signal path having the best error estimate" should be replaced by –the signal path corresponding to the error estimate having the least amount of error—to be more definite.

Regarding claim 5, in line 13, "the difference" should be replaced by –the difference--, in line 15, "the channel estimate" should be replaced by –a channel estimate--, and "the state of the radio channel used" should be replaced by –a state of a radio channel used--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 4, 5, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Love et al (5363412 – IDS Paper No. 5; Ref. BR; hereafter "Love") in view of Dent et al (US 6567475; hereafter "Dent"), and in further view of Wallerius et al (US 6192038; hereafter "Wallerius").

Regarding claim 1, Love discloses a method of detecting an interfering signal in a time division multiple access (TDMA) radio receiver (fig. 2; col. 2, line 22), the method comprising: taking samples from symbol sequences of a received signal over a TDMA timeslot (col. 3, lines 10-18); generating by a modulation detector a signal path or signal value corresponding to the TDMA timeslot or a portion thereof (col. 3, lines 50-52); and

determining an error estimate representing the erroneousness of the signal path generated (col. 3, lines 50-65). Love discloses a typical, almost notoriously known, receiver of a TDMA transmission. The method of the receiver is shown by figure 3. The signal path is determined by the Viterbi decoder (22), and the channel impulse response or error estimate is determined by the channel predictor and channel estimator (26 & 25, respectively). By this method of reception of the TDMA signal, *a minimum least* ***squared error*** *or maximum likelihood sequence estimator (MLSE) evaluation is used to make symbol decisions (col. 2, lines 9-17)*. Love discloses that the MLSE evaluation determines the error estimate or error signal (e(j-D)) wherein the error estimate representing the erroneousness (or error against expected path) of the signal path is a signal path error metric is at least in part generated by error calculated on the basis of a difference (col. 3, line 60) between individual symbol sequence specific sample points or the current estimated signal (yHD(j-D)) and corresponding reference constellation points or the current estimate of the channel impulse response constructed on the basis of a channel estimate describing a state of a radio channel used (col. 3, lines 50-65). The use of a MLSE estimator to assist in the decision of received symbols is well known by one having skill in the art. Love does not explicitly disclose that quadratic errors are calculated, although the use of a least squared error evaluation implies that a squared error is evaluated. However, as reference to the operation of a MLSE estimator, Dent teaches that the delta metric or error difference "is the magnitude squared of the difference between the received signal sample and the predicted signal sample" (col. 16, lines 14-17). Dent teaches that an MLSE estimator uses a squared difference

between a received signal sample and the predicted or estimated constellation points of the current channel estimate (col. 15, line 65 – col. 16, line 35). Therefore, Dent explicitly discloses that, as implied by the definition of any MLSE estimator, a squared or quadratic error is calculated. Alternatively, It would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the MLSE symbol estimator of Dent in the method of Love because it can be used to make very accurate decisions.

Further regarding claim 1, although the method described by Love in view of Dent discloses the generation of an error estimate representing the erroneous of the signal path (fig. 3, "ERROR SIGNAL"), it does not disclose comparing the error estimate representing the erroneous of the signal path with a predetermined threshold value, and recognizing the reception of the interfering signal if the error estimate is greater than the predetermined threshold value. However, Wallerius teaches an analogous receiver method of TDMA signals (col. 2, lines 54-65). Wallerius teaches that the mean squared value of the received signal samples which is a measure of the signal-to-noise ratio is compared to a threshold to determine if a signal should be excluded (col. 14, lines 20-30). The method taught by Wallerius comprises using a predetermined threshold to make a determination of a received signal which should be excluded, and the reception of an interfering signal is analogous to the reception of a signal that is not usable or should be excluded. Therefore, it would have been obvious to one of ordinary skill in the art at the time which the invention was made to use the interfering signal determination as taught by Wallerius in the TDMA reception method disclosed by Love

in view of Dent because the determination of an interfering signal would be advantageous to the system so that data which is not usable is discarded.

Regarding claim 4, Love in view of Dent, and in further view of Wallerius disclose the limitations of claim 1 as applied above. Further, Love discloses the method further comprising generating two or more alternative signal paths (fig. 5, refs. 44, 45; col. 2, lines 10-15) from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), determining an error estimate of each signal path, and selecting the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Regarding claim 5, Love in view of Dent, and in further view of Wallerius disclose the limitations of the claim as applied to claim 1 above.

Regarding claim 8, Love in view of Dent, and in further view of Wallerius disclose the limitations of claim 5 as applied above. Further, discloses equipment comprising two or more parallel modulation detectors (fig. 5, refs. 44, 45; col. 2, lines 10-15) of different types for generating two or more alternative signal paths from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), the equipment being arranged to determine an error estimate of each signal path and to select the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Regarding claims 9 and 10, Love in view of Dent, and in further view of Wallerius disclose the limitations of the claim as applied to claim 1 above.

6. Claims 2, 4, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Love in view of Dent, in further view of Wallerius, and in further in view of LaRosa et al (5323421 – IDS Paper No. 5; Ref. AR; hereafter "LaRosa").

Regarding claim 2, Love in view of Dent, and in further view of Wallerius disclose the limitations of claim 1 as applied above. Love in view of Dent, and in further view of Wallerius do not disclose the method of claim 1 characterized by using in the comparison an error estimate of a signal path corresponding to a half timeslot. However, LaRosa teaches a TDMA receiver (col. 1, lines 24-27) method that performs a channel quality estimation or finds the channel error estimate (col. 1, lines 50-55). Further, LaRosa teaches that the accuracy of conventional channel error estimates is insufficient because of the limited number of bits within the estimation interval (col. 1, lines 37-47; lines 56-60) and teaches a method wherein the channel estimator uses all bits from entire sub-intervals in the estimate (col. 2, line 65 – col. 3, line 9). LaRosa teaches that by using only the bits of the "sync words", the channel error estimate can be insufficiently accurate (col. 1, lines 50-55). In view of the teachings of LaRosa, it is obvious that the best channel error estimate can be acquired by using as many bits as possible from the receiving signal(s) during the error estimation. Therefore, it would have been obvious to one of ordinary skill in the art at the time which the invention was made to utilize as many bits as possible in the receiving signal for the estimation of the channel error as taught by LaRosa in the TDMA receiver method of Love in view of Dent, and in further view of Wallerius because the channel error estimate would be as accurate as possible. The applicant's explanation of the use of a "half timeslot" worth of

bits in the channel error estimate on page 2, line 22 is made as "for example", and does not imply any particular novelty with the exact number (a half timeslot worth) of bits. It would have been obvious for one of ordinary skill in the art to use more bits from a TDMA frame for the channel error estimate than those only found in the synchronization word. For example, it would be obvious to one of ordinary skill in the art to use any number of bits between only the number of bits in the sync word to the total number of bits in the TDMA frame, including half the bits, as only limited by the cost and complexity of the receiver system.

Regarding claim 4, Love in view of Dent, in further view of Wallerius, and in further view of LaRosa disclose the limitations of claim 2 as applied above. Further, Love discloses the method further comprising generating two or more alternative signal paths (fig. 5, refs. 44, 45; col. 2, lines 10-15) from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), determining an error estimate of each signal path, and selecting the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Regarding claim 6, Love in view of Dent, in further view of Wallerius, and in further view of LaRosa disclose the limitations of the claim as applied to claim 2 above.

Regarding claim 8, Love in view of Dent, in further view of Wallerius, and in further view of LaRosa disclose the limitations of claim 6 as applied above. Further, Love discloses equipment comprising two or more parallel modulation detectors (fig. 5, refs. 44, 45; col. 2, lines 10-15) of different types for generating two or more alternative signal paths from the received timeslot or a portion thereof by two or more parallel

modulation detectors preferably of different types (col. 2, lines 10-15), the equipment being arranged to determine an error estimate of each signal path and to select the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
December 10, 2004

jmp

CHIEH M. FAN
PRIMARY EXAMINER